FIG. 1A
Related Art

Source image

Target image

Grobal mapping function
$(x,y)=(X(u,v),Y(u,v))$

u

v

x

y

FIG. 1B
Related Art

Local mapping function:
$(x_i, y_i) = (X(u_i, v_i), Y(u_i, v_i))$

Source image

Target image

R_1 R_2 R_3 R_4

R_i

FIG. 2
Related Art

Forward mapping
function:
$(x,y)=(X(u,v),Y(u,v))$

Backward mapping
function:
$(u,v)=((U(x,y),V(x,y))$

x

y

(x_0,y_0)

Target image

u

v

(u_0,v_0)

Source image

FIG. 3
Related Art

Horizontal scan data input → 301 Horizontal warping processor

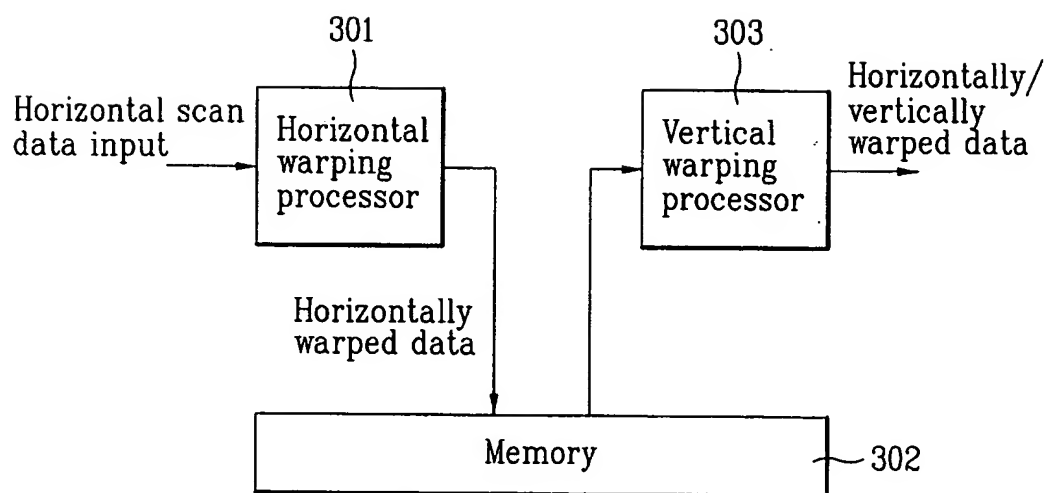303 Vertical warping processor → Horizontally/ vertically warped data

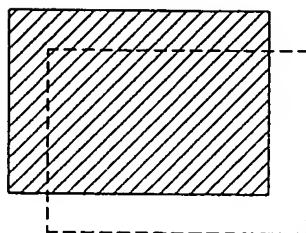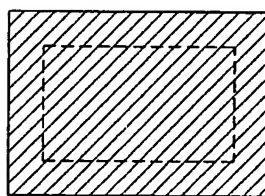Horizontally warped data

Memory ~ 302

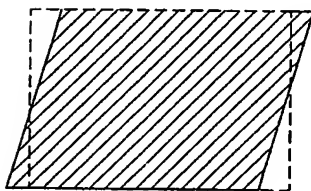# FIG. 4A
Related Art
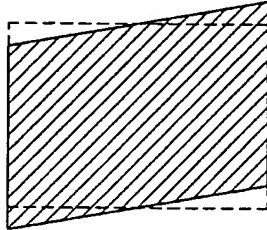
Shifting

FIG. 4B
Related Art

Scaling

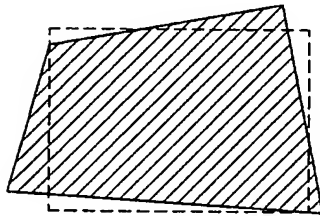# FIG. 4C
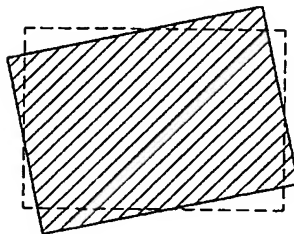# Related Art

Horizontal Skew

FIG. 4D
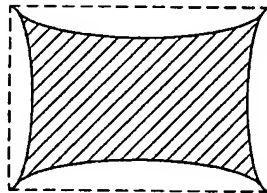# Related Art

Vertical Skew

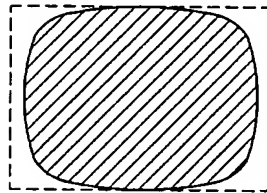# FIG. 4E
Related Art

Keystone

FIG. 4F
Related Art

Tilt

FIG. 4G
Related Art

Pincushion
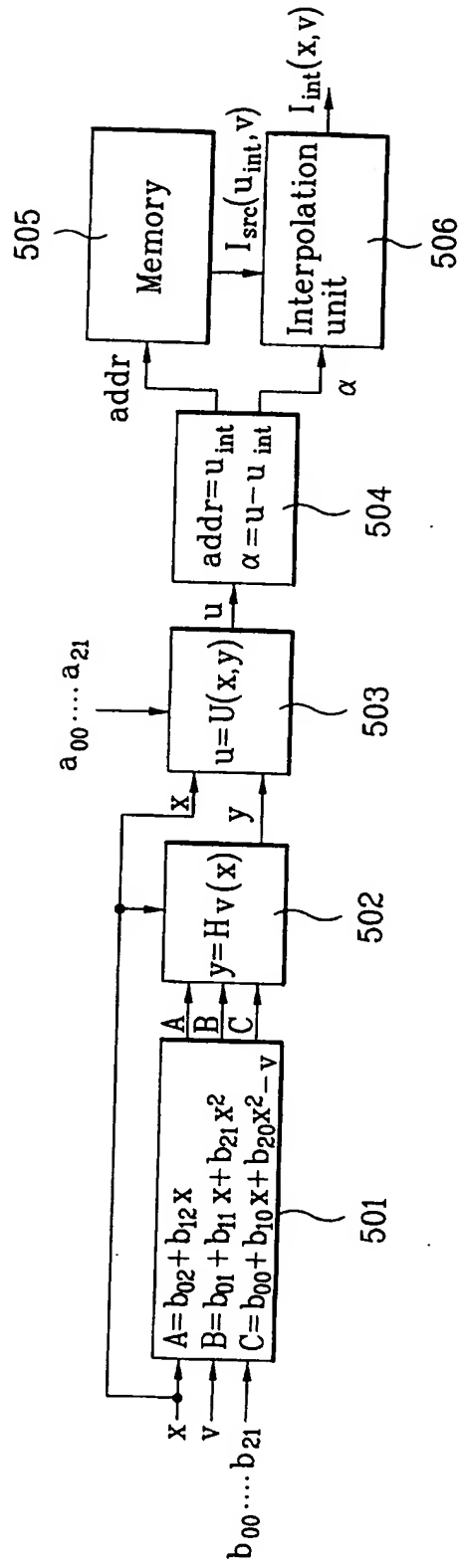
FIG. 4H
Related Art

Barrel

FIG. 5

x ———

v ———→

$b_{00} \cdots b_{21}$ ———→

501
$A = b_{02} + b_{12}\,x$
$B = b_{01} + b_{11}\,x + b_{21}\,x^2$
$C = b_{00} + b_{10}\,x + b_{20}\,x^2 - v$

$\xrightarrow{A}$ $\xrightarrow{B}$ $\xrightarrow{C}$

502
$y = H_v(x)$

$\xrightarrow{x}$

$\xrightarrow{y}$

$a_{00} \cdots a_{21}$ ———→

503
$u = U(x, y)$

$\xrightarrow{u}$

504
$addr = u_{int}$
$\alpha = u - u_{int}$

$\xrightarrow{addr}$

505
Memory

$\xrightarrow{I_{src}(u_{int}, v)}$

$\xrightarrow{\alpha}$

506
Interpolation unit

$\xrightarrow{I_{int}(x, v)}$

FIG. 6

FIG. 7

$$u_{int}-1 \qquad u_{int} \qquad u \qquad u_{int}+1 \qquad u_{int}+2$$
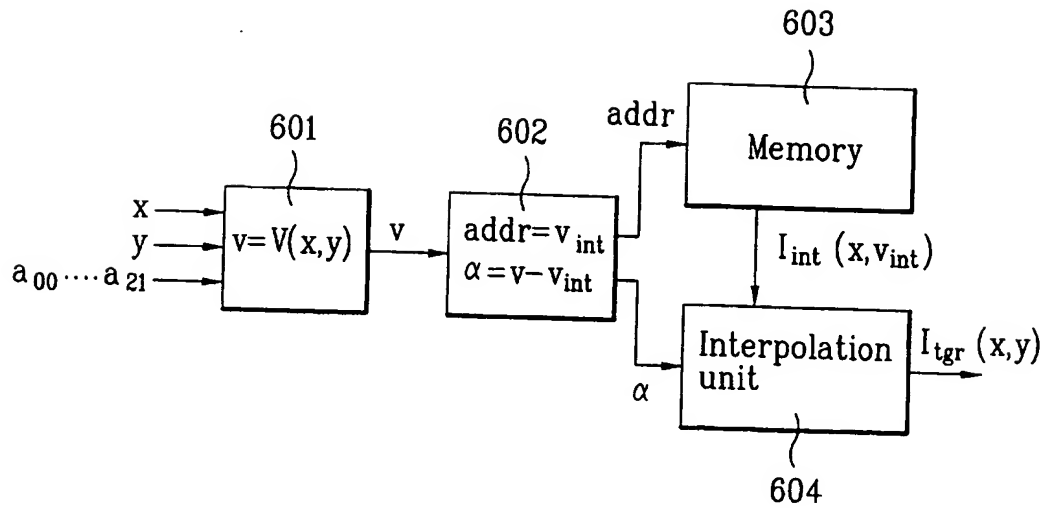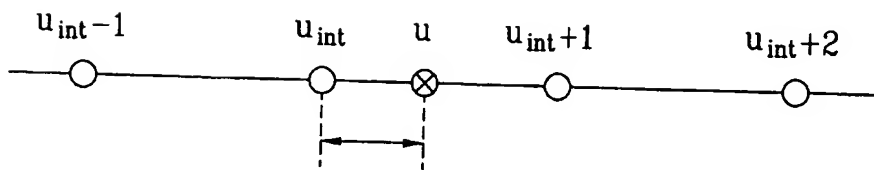
Bilinear Interpolation:
$$I_{int}(u,v)=(1-\alpha)I_{src}(u_{int},v)+\alpha I_{src}(u_{int}+1,v)$$